BOTANICAL GAZETTE.

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Botanical Papers of George Engelmann.

PREPARED BY C. S. SARGENT.

The following list contains, so far as I know, all the botanical papers published by Dr. Engelmann. A few short notes in the *Gardener's Chronicle*, of London, to which Dr. Engelmann was an occasional contributor, may have escaped notice. If this is the case, the editor of that journal will, no doubt, supply the omissions. It will be seen that the publication of these papers extended over a period of fifty-one years, the last having appeared only a few weeks before the death of the author.

De Antholysi Prodromus. Dissertatio inauguralis phytomorphologica.
Frankfort. 5 tab. 1832.

A monography of North American Cuscutineæ.
Am. Jour. Sci. 1. 43. 333–345, 1 tab. 1842.

Corrections and additions to the same.
Am. Jour. Sci. 1. 45. 73–77. 1843. (Bot. Zeit. 2. 553–555, 1844; 4. 273–281, 1846; London Jour. Bot. 2. 189–199, with original additions and corrections, 1843.)

Notes and additions to a monography of the North American species of the genus Equisetum by Alexander Braun.
Am. Jour. Sci. 1. 46. 81–91. 1844.

Introductory note to a brief notice of the Charæ of North America by Alexander Braun.
Am. Jour. Sci. 1. 46. 92–93. 1844.

Catalogue of a collection of plants made in Illinois and Missouri by Charles A. Geyer, with critical remarks, etc.
Am. Jour. Sci. 1. 46. 94–104. 1844.

Plantæ Lindheimerianæ; an enumeration of the plants collected in Texas, etc., by F. Lindheimer, with remarks and descriptions of new species (with A. Gray).
Boston Journ. Nat. Hist. 5. 210–264. 1845.

Notes on the North American species of Isoëtes and Marsilea by Alexander Braun.

Am. Jour. Sci. 2. 3. 52–56. 1847.

Notes on some Ferns of the U. S by Professor Kunze of Leipsic; with notes by A. Braun and G. Engelmann.

Am. Jour. Sci. 2. 6. 80–89. 1848.

Sketch of the Botany of Dr. A. Wislizenus' Expedition.

An appendix to the Memoir of a Tour to Northern Mexico connected with Col. Doniphan's Expedition in 1846–1847, 87–115. Senate Publication. 1848.

Plantæ Fendlerianæ, Drymaria nodosa, n. sp. 12; Talinum calycinum, n. sp. 14; N. Am. Gerania, 26; Calliandra Chamædrys, n. sp. 39; Cactaceæ, p 49; Loranthaceæ, 58.

Mem. Am. Acad. Arts and Sci. 4. 1849.

Plantæ Lindheimerianæ, Part 2, Vesicaria recurvata, n. sp. 147; Paronychia Lindheimeri, n. sp. 152; Eysenhardtia spinosa, n. sp. 174; Prunus minutiflora, n. sp. 185; Passiflora tenuiloba, n. sp. 192; Cactaceæ, 195; characters of Daucosma (with A. Gray), 210; Loranthaceæ, 212.

Boston Jour. Nat. Hist. 6. No. 11. 1850.

On the character of the vegetation of S. W. Texas.

Proc. Am. Ass. Sci. 5. 223–229. 1851.

Notes on Cereus giganteus of S. E. California and some other Californian Cactaceæ.

Am. Jour. Sci. 2. 14. 335–339, 446. 1852.

Plantæ Wrightianæ, Part 1, Notes upon Linum, 25; Rhus microphylla, 31; Desmodium Wislizeni, 53; Characters of Fendlera (with A. Gray).

Smithsonian Contrib. to Knowledge. 3. Art. 5. 1852.

Further notes on Cereus giganteus of S. E. California, with a short account of another allied species of Sonora.

Am. Jour. Sci. 2. 17. 231–235. 1854.

Cactaceæ of Pacif. R. R. Expedition.

Pacif. R. R. Rep. 4. Pt. 5. No. 3, 27–58, 24 tab. 1856.

Elaboration of Cuscuta, Euphorbia, Alisma, Sagittaria, Echinodorus.

Gray's Manual Northern United States, 2d ed. 1856.

Synopsis of the Cactaceæ of the U. S. and adjacent regions.

Proc. Am. Acad. 3. 259–314, 345–346. 1856.

Account of the western part of Texas.

Boston Jour. Nat. Hist. 6. 34–40. 1857.

Two new diœcious grasses of the United States.

Trans. St. Louis Acad. Sci. 1. 431–442, 3 tab. 1859.

Systematic arrangement of the species of the genus Cuscuta, with critical remarks on old species and descriptions of new ones.

Trans. St. Louis Acad. Sci. 1. 453–523. 1859.

Cactaceæ of the Mexican Boundary.

U. S. and Mexican Bound. Surv. 2. Pt. 1. 1–78, 76 tab. 1859.

The Grape Vines of Missouri.
Trans. St. Louis Acad. Sci. 1. 660–662. 1860.

Remarks on the hybrids of Verbena.
Trans. St. Louis Acad. Sci. 1. 675–676. 1860.

Botany in Rep. Geol. and Nat. Hist. of the Upper Missouri, by F. V. Hayden.
Trans. Am. Phil. Soc. n. ser. 12. 182–212. 1861.

Cactaceæ and Euphorbiaceæ of Ives Report.
Colorado of the West, Part 4, 12–14, 26–27. 1861.

Notes in the Enumeration of the Plants of the Rocky Mts., by Asa Gray.
Am. Jour. Sci. 2. 34. 256–257; Supplements, 1 and 2, 330–335. 1862.

Remarks on Nelumbium luteum, 136; on the dimorphism of Draba brachycarpa, 154; on 2 species of fungi destructive to vineyards, 165; on the nature of the pulp of Cactus fruit, 166; on the structure and fruit of the genus Ribes, 180.
Trans. St. Louis Acad. Sci. 2. 1862.

Additions to the Cactus Flora of the United States.
Trans. St. Louis Acad. Sci. 2. 197–204. 1862.

On Pinus aristata, a new species of Pine discovered by Dr. C. C. Parry in the alpine regions of Colorado Territory; and on some other Pines of the Rocky Mts.
Trans. St. Louis Acad. Sci. 2. 205–214, 2 tab. 1862. (Linnæa, 33, 383–394.)

Note on Polygonum tenue.
Proc. Philad. Acad., March, 1863, 75.

New species of Gentiana from the alpine regions of the Rocky Mts.
Trans. St. Louis Acad. Sci. 2. 214–218, 5 tab. 1863.

Remarks on the fruit and seed of different species of Viburnum and Cornus.
Trans. St. Louis Acad. Sci. 2. 269–271. 1865.

New plants from the Rocky Mts.; Nuphar polysepalum, etc.
Trans. St. Louis Acad. Sci. 2. 282–285. 1865.

Elaboration of Cillitriche, Pinus, Juncus, Sparganium, Isoëtes.
Gray's Manual Northern U. S., 5th ed. 1867. In addition to genera in 2d ed.

A Revision of the North American species of the genus Juncus, with a description of new or imperfectly known species.
Trans. St. Louis Acad. Sci. 2. 424–498, 590. 1868.

Weber der Charactere der Abietinun genera.
Bot. Zeit. 26. 484–487. 1868.

Speirodela.
Bull. Torr. Bot. Club. 1. 42–43; 2. 10–11, 46–47. 1870, 1871.

Notes on Opuntia and Speirodela.
Bull. Torr. Bot. Club. 2. 34–35. 1871.

Cactaceæ, Yucca, Agave, Hesperaloe.
King's Rep. Geol. Surv. 40th Par. 5. 115–120, 496–497. 1871.

The flower of Yucca and its fertilization.
Bull. Torr. Bot. Club. 3. 33. 1872.

Agave.
Bull. Torr. Bot. Club. 3. 37. 1872.

Arceuthobium minutum.
Trans. St. Louis Acad. Sci. 3. 83. 1872.

The true Grape Vines of the old United States.
Am. Naturalist, 6. 539–542. 1872.

Notes on the genus Yucca.
Trans. St. Louis Acad. 3. 17–64, 210–214, 371–372. 1873.

Juncus maritimus.
Bull. Torr. Bot. Club. 4. 40. 1873.

Vitis.
Bull. Torr. Bot. Club. 5. 233–234, 310–311. 1874.

The true Grape Vines of the United States.
Sixth Ann. Rep. State Entomologist of Mo., 70–76. 1874.

Lecture on the Forests of the Rocky Mountains.
Reported in St. Louis Democrat, March 6, 1875. (Meehan's Gardener's Monthly, 17. 151–153, 181–184, 214–217.)

The true Grape Vines of the United States.
Bushberg Cat. 2d ed. 4–11, 1 tab. 1875.

About the Oaks of the United States.
Trans. St. Louis Acad. Sci. 3. 372–400, 539–543. 1876, 1877.

Characters of Abies subalpina.
Am. Naturalist, 10, 553–555. 1876.

Notes on Coniferæ.
Proc. Philad. Acad., 1876, 173–175. (Meehan's Gardener's Monthly, 19, 308.)

Report of an Expedition across the Great Basin of Utah Terr. in 1859, by Capt. J. H. Simpson (Engineer Dept. U. S. Army).
Appendix M. Botany, 435–447, 3 tab. 1876.

Oak and Grape Fungi.
Trans. St. Louis Acad. Sci. 3. 215–216. 1876.

Morphology of the carpellary scale of Coniferæ.
Am. Jour. Sci. 3. 12. 469. 1876.

Geographical range and migration of plants and animals.
Trans. St. Louis Acad. Sci. 3. 219–232. 1876.

A new Cuscuta, 69; Cuscuta racemosa, 80; Pinus serotinæ, 125.
Botanical Gazette, 2. 1877.

On Abies Menziesii and A. Engelmanni.
Gardener's Chronicle, London, n. ser. 7. 790. 1877.

Geographical Distribution of North American Flora.
Trans. St. Louis Acad. Sci. 3. 270–271. 1877.

The American Junipers of the section Sabina.
Trans. St. Louis Acad. Sci. 3. 583–592. 1877.

Agave, with 2 photographs, 291–322, 370–371; Flowers of Agave Shawii, 579–582, 1 tab.
Trans. St. Louis Acad. Sci. 3. 1878.

The species of Isoëtes of the Indian Territory.
Bot. Gazette, 3. 1. 1878.

Baptisia sulphurea.
Bot. Gazette, 3. 65. 1878.

A Synopsis of the American Firs (Abies of Link).
Trans. St. Louis Acad. Sci. 3. 593–602. 1878.

Cactaceæ, Asclepiadeæ, Gentianeæ, Cuscuteæ, Euphorbiaceæ, Cupuliferæ, Loranthaceæ, Coniferæ, Amaryllideæ, Junceæ.
Wheeler's Rep. U. S. Geog. Surv., 6. 1878.

Pine.
Johnson's Univ. Cyclopædia, 3. 1256–1275. 1878.

Cuscuta.
Gray's Syn. Fl. N.A. 1. 219–224. 1878.

The Gymnospermy of Coniferæ. (Review of a paper by Dr. L. Celakovsky in Flora for June, 1879.)
Am. Jour. Sci. 3. 18. 311–313. 1879.

Wild Grapes.
Trans. St. Louis Acad. Sci. 4. 44. 1880.

Revision of the genus Pinus, and description of P. Elliottii.
Trans. St. Louis Acad. Sci. 4. 161–193, 3 tab. 1880.

The Acorns and their germination.
Trans. St. Louis Acad. Sci. 4. 190–192. 1880.

Catalpa speciosa, Warder.
Bot. Gazette, 5. 1. 1880.

Vitality of the seeds of serotinous cones.
Bot. Gazette, 5. 62. 1880.

Fraxinus quadrangulata.
Bot. Gazette, 5. 63. 1880.

Cupuliferæ, Loranthaceæ, Abietineæ.
Rep. Geol. Surv. California. 2. 1880.

Notes on Abies amabilis and A. grandis.
Gardener's Chronicle, London, n. ser. 14. 720. 1880.

Some account of the vegetation along the Great Lakes.
Trans. St. Louis Acad. Sci. 4. 20. 1880.

Some additions to the North American Flora.
Bot. Gazette, 6. 223–225, 238. 1881.

Western Conifers.
Bot. Gazette, 7. 4–5. 1882.

Some additions to the North American Flora.
Bot. Gazette, 7. 5–6. 1882.

Texas Oaks.
Bot. Gazette, 7. 14. 1882.

Yucca elata, n. sp., Y. macrocarpa, n. sp.
Bot. Gazette, 7. 17. 1882.

Female flowers of Coniferæ.
Bot. Gazette, 7. 104–105. 1882.

The Black-fruited Cratægi, and a new species.
Bot. Gazette, 7. 127–129. 1882.

Additions to the Flora of the United States (Cratægus arborescens, Sagittaria natans).
Bull. Torr. Bot. Club, 9. 4–5. 1882.

Rosa minutifolia, n. sp.
Bull. Torr. Bot. Club, 9. 97–98, 127. 1882.

Note on Picea Engelmanni and P. pungens.
Gardener's Chronicle, London, n. ser. 17. 145. 1882.

Pinus tatisquama, n. sp.
Gardener's Chronicle, London, n. ser. 18. 712. f. 125. 1882.

The Female flowers of Coniferæ.
Am. Jour. Sci. 3. 23. 418–422; 24. 233–235. 1882.

The genus Isoëtes in North America.
Trans. St. Louis Acad. Sci. 4. 358-390. 1882.

Note on Catalpa speciosa.
Trans. St. Louis Acad. Sci. 4. 50. 1882.

Euphorbia deltoidea.
Chapman's Fl. S. States. Suppl. 647. 1883.

Plantago pusilla.
Bot. Gazette, 8. 175. 1883.

Vitis palmata.
Bot. Gazette, 8. 254. 1883.

Brooks' Wood Specimens.
Bot. Gazette, 8. 337, 338. 1883.

Morphology of Spines.
Bot. Gazette, 8. 338. 1883.

The true Grape Vines of the United States, and the Diseases of Grape Vines.
The Bushberg Cat. 3d ed. 9–20, 47–48. 1883.

The Occurrence of Cork between the Annual Layers in the Stem of Catalpa speciosa, Warder.

BY C. R. BARNES.

Mr. W. H. Ragan, Secretary of the Mississippi Valley Horticultural Society, handed to me recently a small section of *Catalpa speciosa* (fig. 4), grown from the seed by A. H. Gaston, at Lacon, Ill. The specimen was cut from the lower end of a tree three years old, and was intended to show the great rapidity of growth of this species. Truly the growth had been rapid, as the following measurements show:

First year's growth, average radius, 7.5^{mm}
Second " " " thickness, 12.5^{mm}
Third " " " " 11.5^{mm}
Bark " " 3^{mm}
Average diameter of stem, 67.5^{mm}

But the rapidity of growth is by no means the most remarkable feature of this specimen. The yearly rings are separated by zones, more or less complete, of cork tissue. Around the first year's growth the cork zone (*a*, fig. 4) is narrow but continuous, and is traversed by numerous medullary plates. Around the second year's growth the cork zone (*b*, *c*, *d*, *e*, fig. 4) is of greater width, in places, but is not continuous. By the aid of a lens, the more prominent medullary plates may be seen to traverse this outer cork zone. The second year's growth shows (more distinctly since oiling the section with linseed oil) three truncated wedges (*f*, *g*, *h*, fig. 4) appearing darker than the rest of the wood, and occupying about 30° of the circles which form their central and peripheral ends.* The portions of the cork zone opposite these areas are considerably wider than elsewhere, as shown at *c*, *d* and *e*, fig. 4. At *e* the thickness amounts to 2.8^{mm}. Just beyond *e* the cork zone tapers out quite abruptly, and from this point to the edge of the removed sector is entirely absent, the difference between the annual layers being here marked only by the difference in the texture of the spring and autumn wood. This gap in the zone (at *i*, fig. 4) occurs opposite to the area which should be occupied by a fourth wedge (corresponding to *g*, fig. 4), were it present.

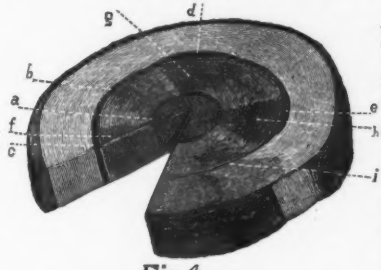

Fig. 4.

Although these zones which have been described had every appearance of cork, I could hardly believe that cork could occur in such an anomalous place. Having cut transverse sections of the tissue in question (near *c*, fig. 4) and part of the adjacent wood on each side, I submitted some to the prolonged action of c. p. sulphuric acid and treated others with an ammoniacal solution of copper oxide.† In both cases the tissue remained unchanged. In the first case the wood cells (excepting the middle lamella) were dissolved. In the second case the whole section

[*I have not been able to discover any difference in structure between these wedges and the intervening wood, and am unable to account for their presence, unless they be three of four normal (?) groups of fibro-vascular bundles, indicating kinship with *Bignonia capreolata*.]

†Poulsen's Bot. Mikrochemie, Germ. tr. by Müller, pp. 14, 16 and 61.

was unchanged. Both reagents when applied to cotton fibers quickly destroyed them.

Figs. 1 and 2, Plate I, represent transverse sections, and fig. 3 a longitudinal radial section of this tissue, taken near *c*, fig. 4. The transition between the wood cells centrad of the cork and the cork cells is remarkably abrupt (fig 1). On the peripheral side of the cork there is no such abruptness, the cork cells, *c*, *c*, *c*, fig. 2, shading imperceptibly into the wood cells, *x*, *x*.

In all the sections the cork cells are seen to be quite irregular, much more than this tissue normally is. Some sections from other parts of the stem showed a more regular tissue; in several instances radial series of rectangular cells were observed, though fig. 1 is about the average as to regularity.

The wood cells last formed in autumn are quite different from the earlier ones. In fig. 1 the last .12^{mm} of wood cells (from *a* to *b*) are thicker walled and have less angular cavities than the older portion. In fig. 3 the difference is still more marked, the wood from *a* to *b* consisting of greatly elongated fibers with irregularly thickened walls; whereas the majority of the wood consists of shorter, smooth-walled fibers with oblique ends (*x*, fig. 3).

I am unable to present any satisfactory explanation of the formation of cork in the positions described. Numerous theories have suggested themselves, but all are open to too grave objections to be worth presenting.

EXPLANATION OF PLATE.—Figs. 1 and 2. Transverse sections of a portion of the stem of *Catalpa speciosa*, Warder.

Fig. 3. Longitudinal radial section of the same.

The reference letters are the same in all the figures.

c, cork cells; *C*, central side of the section; *m*, cell of medullary ray, with pitted walls; *p*, large pitted vessel; *P*, peripheral side of the section; *x*, smooth walled wood fibers; x^1, younger wood fibers with irregularly thickened walls.

All the figures were drawn with a camera, under Beck's ⅓ objective and A eyepiece.

GENERAL NOTES.

A New Aristida.—ARISTIDA BASIRAMEA, Engelmann in a letter to W. Upham.—Annual: culms erect, 6 to 15 inches high, slender, much branched at the base (some of the branches very short but floriferous), and with short floriferous branches enclosed in the upper leaf sheaths: leaves comparatively long (3 to 6 inches), narrowly linear, flat, becoming involute toward the apex, sparsely hairy on the margins below, the upper ones nearly equaling the panicle; sheaths striate, loose; ligule very short, truncate: panicle 1½ to 3 inches long erect, rather lax, its base sheathed by the upper leaf; branches of the panicle

short, mostly single, the lower in twos or threes: glumes linear, unequal, 1-nerved, lower one 4 lines, upper one 6 lines long including the short bristle-like point; flowering glume nearly terete, spotted with black, about 5 lines long including the short, acute and hairy callus; middle awn about 6 lines long, the lateral ones about 4 lines long, spirally twisted below (when mature). The sheathed flowers are somewhat smaller.

This species was discovered last season by Mr. Warren Upham, at Minneapolis, Minn. The late Dr. Engelmann suggested the name, in a letter, as indicative of its habit, and would have published it if he had lived. It is closely related to *A. dichotoma*, from which it differs in its shorter, erect (not dichotomous) culms, and in its much larger flowers, and especially in the much longer, spreading, lateral awns. From *A. gracilis* it differs in the shorter panicle, the longer upper leaves with sheathed flowers, and in the flowers being twice as large. From *A. ramosissima* it differs in wanting the larger size, the diffusely branched habit, the much larger flowers with 3 to 5-nerved glumes, and the strong recurved middle awn of that species. It is probably widely diffused in the prairie region of the Northwest, Mr. Upham having received it from St. Cloud and other places in Minnesota, with reports of it from Iowa and Manitoba. It appears also to be the same as specimens collected in Kansas by Mr. E. Hall and distributed as *A. gracilis*.—GEO. VASEY.

Fungi Hungarici.—The third Century of this exsiccata has recently been issued by the publisher, Prof. George Linhart, Altenburg, Austro-Hungary The specimens are neatly mounted on heavy papers of the size of eight by ten inches; each Century being enclosed in a light box with an alphabetical index of the specimens on the cover. The habitats and notes on the labels are given, both in Hungarian and German, and to each is added the name of the collector and author by whom the specimen was determined. Several new specimens have appeared in each Century, accompanied by descriptions in Latin. Each Century is furnished with from 15 to 20 illustrations of the microscopic characters of specimens therein contained. Two Centuries are to be issued annually, and at the close of each five Centuries the author intends furnishing descriptions of the species, both in Hungarian and German. Among foreign exsiccata this work appears to merit the favorable recognition and encouragement of Mycologists. The original cost of 11 marks per Century is increased to American subscribers by expenses of transportation, etc., to nearly five dollars. Subscriptions may be addressed direct to the publisher. —EUGENE A. RAU, *Bethlehem, Pa.*

The pasque flower.—This plant (*Anemone patens*, var. *Nuttalliana*) is stated in *Drugs and Medicines of N. America* to have so acrid a juice that the hands have been blistered in handling it, and the eyes temporarily closed by its irritating vapors. The writer hereof has passed most of his life where it grows abundantly, and is surprised to hear of its harmful nature. If crushed between the fingers it gives a nasal sensation and watering of the eyes similar to strong ammonia, and on this account is sometimes locally known as "hartshorn plant." To those who like the smell of ammonia it is rather agreeable than otherwise. —J. C. A.

American Forests.—Dr. J. T. Rothrock, of the University of Pennsylvania, recently delivered one of the course of University lectures in Association Hall, Philadelphia, taking for his subject "The relation of American Forestry to American Industry." Some of its salient features are brought out in the following synopsis from *The American:*

His University lecture was a summary of the latest development of the necessity of forestry laws to protect the future timber trade of the country. He showed the percentages of timber land to other productive territories, from the three per cent. of Great Britain to the forty-five per cent. of Sweden, and that the lowest ratio that can be called self-sustaining is fifteen per cent., while we have only a margin of one and a half per cent. between dearth and supply. At the rate at which our forests are being destroyed, this small advantage will soon disappear, and then there will be a timber famine throughout the land. Great Britain, between 1872 and 1876, imported seventy-seven million dollars' worth of timber—about $2.60 for each individual—while the supply was only about $1.30 from native sources. In the United States, besides using about $19.90 per head, we exported six hundred million dollars' worth. How long this can last is a questton of time, and very little time, too. There ought to be as large a proportion of woodland to clear land for atmospheric purification as for timber supply. The rain-fall is not necessarily affected by clearing off the timber; but failing springs and falling rivers do result from it, for forests diminish evaporation over eighty per cent.

What is the practical remedy within reach? Professor Rothrock points to Germany, with its nine forest schools, their high standard, and their able teachers and growing classes of pupils. One man in this country, Professor Sargent, of Massachusetts, is the only person employed and paid by a State to look after our vast empire of timber. He has worked hard to secure active measures to protect the interest entrusted to him. An exemption of preserved forests from taxes would soon return the loss of revenue in the enhanced value of the timber. The reckless destruction of trees is the first thing to be cured. Even if Congress withdraws national timber land from sale, it will be only a palliative, and there are no trained men to which this enormous source of future wealth can be safely entrusted. Within five years, our best white pine will all be gone; within thirty-five or forty years, all the rest of our good timber will have been exhausted. Can there be any question about the necessity of such legislation, State and National, as shall protect the country from a timber famine?

Variation and Human Interference.—EDITORS BOT. GAZETTE:—I see that Mr. Meehan, in your March number, does not get the idea that I wish to convey concerning variation. It seems to me that when variation *of a nature favorable to man's wishes* is found in plants, and not especially beneficial to the plant, that such variation *suggests human interference* and points towards *a prehistoric cultivation.* That the persimmon occasionally bears seedless fruit is well known, and I append a list of seedless fruits, or of reputed seedless fruits, that I have found mention of in my readings, arranging my material alphabetically. For further particulars and references, I would refer to my articles on "Seedless Fruits," published in the Transactions of the Massachusetts Horticultural Society, Part I., 1880.

Apple:—Fewer seeds in improved varieties than in the wild apples of Thoreau. Second crop apples rarely contain seed; quite numerous records of seedless fruit.

Azarole (*Crataegus azaroleus.*):—The best varieties bear no or few seeded fruit. (Darwin, An. & Pl.)

Banana:—A seedless fruit.

Barberry:—Has a stoneless variety.

Breadfruit:—The cultivated varieties usually seedless; the wild fruit and the poorer varieties bearing seed.

Cherries:—The cultivated varieties in part seedless. Of five varieties examined in 1882, 140 pits had 62 abortive, and one variety 28 out of 30 abortive.

Chamærops stauracantha:—Has the character of producing sterile fruit, but mixed with fertile in the same panicle. The pulp of the fruit is of a peculiar delicate, spongy consistence, and of a pure white and shining on the outside. The fruit is oblong, about one inch in largest diameter. It has probably been brought under a certain amount of cultivation from very remote times. (H. Prestoe, Rept. Trinidad Bot. Gard. 1880, p. 39.)

Citron:—Gallesio mentions the Long orange, and the Chinese orange citrons as seedless, or nearly so.

Cucumbers:—Are frequently seedless, especially when grown under glass.

Cycads:—In Focke's work, Die Pflanzen Mischlinge, he states that female plants often produce apparently perfect cones in green-houses of Europe, yet their seeds contain no embryos.

Date:—Seedless varieties are named by a number of writers.

Diospyros Kaki:—Varieties often seedless, and Brandis mentions a cultivated variety of *D. melanoxylon*, Roxb. as without stones.

Fig:—This bears seedless fruit in one crop at least, and Brandis says many varieties attain maturity with sterile seed.

Grapes:—So far as I have examined, diminution of seed accompanies progressive improvement in the grape. Many varieties of *Vitis vinifera* are absolutely seedless; the cultivated varieties of the American *Vitis* bear fewer seed in general, and smaller seed, and more variable in number, than the wild species from which they have originated.

Guava:—This is frequently seedless.

Lemon:—Seedless varieties are mentioned by several writers.

Lime:—Seedless varieties mentioned by Gallesio.

Lucuma bifera, Mol. of Chile, bears fruit twice a year. The early set have no kernels, the autumn set have two kernels (Molina, Hist. of Chile, I, 129).

Mangosteen:—In its wild state contains four seed; in the cultivated, much larger fruit, rarely more than one seed (Burbridge).

Medlar:—A stoneless variety is advertised by a French nurseryman, and is mentioned by Loudon.

Mulberry:—Seedless varieties are mentioned in the Orient, where the fruit is appreciated.

Opuntia Davisii, Engelm.:—All the fruit seen on the route on the Upper Canadian, eastward and westward of Tucumcari hills, near the Llano Estacado, were sterile (Engelmann, Pac. R. R. Rept. IV, 49).

Orange:—Seedless varieties mentioned by numerous observers.

Otaheitie Apple (*Spondias dulcis.*):—Commonly has no seeds (Forster Obs. p. 179), and Firminger (Gard. in India, p. 234) says he is told that the seeds never germinate, and young plants are usually obtained by graftings on seedlings of other species.

Peach Palm (*Guiliema speciosa*):—Generally devoid of seed (Humboldt); in most instances the seed is abortive (Seemann); is extremely prolific, bearing two crops a year, sometimes more, and one season all seedless fruits are produced, and the other season only seeded fruits; the seedless fruits are highly appreciated (Prestoe); it nowhere grows wild, but has been cultivated by the Indians from time immemorial (Bates).

Pear:—Second crop pears are invariably seedless (R. Manning) and there is a seedless variety; many varieties have seed usually abortive.

Persimmon:—Seedless fruits and fruit with diminished seed reported by all with whom I have talked who have lived in the region of their best growth. See also T. Meehan's testimony in March BOTANICAL GAZETTE.

Pineapple:—A seedless fruit.

Pistacia:—At Cabul is on record as having one year perfect fruit, the next a seedless fruit.

Pomegranate:—Seedless varieties and those with diminished seed mentioned by writers, and cuttings from a seedless form distributed from the U. S. Patent Office in 1860.

Service (*Pyrus lanuginosa*, Die C.):—According to Loudon, the fruit, when it is produced, is generally without seeds.

Strawberry:—Mr. Saunders, Superintendent of the gardens of the U. S. Dept. of Agr. at Washington, on Feb. 16, 1880, mentioned to me a plat of seedless strawberries that he once had growing, and Thomas Knight also mentions growing seedless fruit (Phys. & Hort. Papers, p. 276).

Tomato:—The improved varieties contain fewer seed than do the unimproved, so far as I have observed, and a variety called "Seedless" is described by Burr as containing but few seeds.

This hasty summary from my notes—not originally collected for the purpose of an article of this tenor—would seem to justify the assertion that seedless fruits is an improvement brought about, in the majority of cases, by human agency, and, as I have shown in my essay on "Seedless Fruits," is usually accompanied by improvement in quality. It is therefore quite logical to assume that when we find a wild fruit, very variable, and varying in a direction more beneficial to man than to the plant, that this plant has obtained its variable property from a sometime human interference.

Has not the doctrine of evolution and causation a sufficient hold upon our thought to justify an attempt at interpreting the plant's story? This attempt to question the plant is what I am doing, and I earnestly beseech the favor of obtaining co-workers in this scheme.—E. LEWIS STURTEVANT, M. D., *Geneva, N. Y.*

Tribute to Dr. Engelmann.—The following preamble and resolutions, indicative of the appreciation of the high scientific and personal character of

the late Dr. George Engelmann, were unanimously adopted by the Botanical Section of the Academy of Natural Sciences of Philadelphia, April 14, 1884:

WHEREAS, The Botanical Section of the Academy of Natural Sciences of Philadelphia has heard with profound regret of the death of Dr. George Engelmann; therefore,

Resolved, We regard this as a calamity to botanical science, and to those who were in any way associated with him in its study; also,

Resolved, That in his life he furnished an example of industry in his profession, of devotion to science, of thoroughness in investigation, and of success in labor, which will always command our admiration and respect; and be it further

Resolved, That by his readiness to aid all who were seekers after the truths of nature, by the conscientious answers to the botanical questions referred to him, no less than by his goodness as a man, we believe he has attached many to the science in whose service he died.

Resolved, That as a mark of respect to the memory of the deceased, these resolutions be entered upon the minutes of the Section, a copy to be transmitted to his family, and also a copy of them be furnished to the *Bulletin of the Torrey Botanical Club* and to the BOTANICAL GAZETTE, with the request that they be published therein.

JOS. T. ROTHROCK.
THOMAS MEEHAN.
JOHN H. REDFIELD.

Collections from Porto Rico.—Herr P. Sintenis (known through his journey in the Orient), is to begin a botanical examination of Porto Rico during the coming summer, under direction of the undersigned. The specimens will be offered at 30 marks ($7.50) a century. The undersigned will receive the names of subscribers to this collection, but prefers that payments should *not* be made in advance. DR. T. URBAN, *Schöneberg bei Berlin, Germany.*

EDITORIAL NOTES.

IN DR. VASEY'S Schedule of N. Am. species of *Paspalum*, in the last GAZETTE, p. 55, No. 5 should read *P. vaginatum* instead of *P. variegatum*.

MR. DAVIS L. JAMES recently read before the Cincinnati Society of Natural History a memorial notice of Thomas W. Spurlock, a botanist of considerable local reputation.

THE MARCH NUMBER of *Grevillea* is accompanied with pages 17 to 32 of the new edition of Cooke's Handbook of Fungi, carrying the genus *Agaricus* through to the eighty-seventh species.

IN THE APRIL *Am. Naturalist* Prof. Bessey gives an account, with figures, of the discovery of glands upon the pedicels of *Sporobolus heterolepis*, to which some minute insects had stuck fast. In fact the victims led to the discovery of the trap.

THE BULLETIN of the Natural History Society of New Brunswick, No. III, contains the report of the Botanical Committee, with additions to the New Brunswick Flora, edited by Mr. G. M. Hay. In the list we note *Montia fontana* and *Potamogeton obtusifolius*.

THERE IS MUCH need for more common names for injurious fungi, and a more accurate use of those we now have, so that the terms "mould," "mildew" and "blight," shall not be made to do duty for scores of fungi more diverse in their affinities than oaks, oranges, and pumpkins.

IN THE POSTAL CLUB BOXES of the *Am. Monthly Micr. Jour.*, we note that one contains a slide said to represent "Eleters and spores of *Asterella remisphærica*," whereupon the editor suggests that it would be better to explain what "eleters" are, in which suggestion botanists will heartily concur.

WE NOTE in the April *Gardener's Monthly* the announcement of the death of Prof. S. B. Buckley, which occurred at his home in Austin, Texas, February 18. His name is very closely connected with Texas botany, and *Buckleya distichophylla*, Torr., is a memorial of his work in the mountains of North Carolina.

IN *Science*, April 4, there is given a capital biographical sketch, with portrait, of Dr. Engelmann. It tells the story so exactly as the GAZETTE would like to have it told, that we refer our readers to it, and in place of a biographical sketch publish in this number a list of Dr. Engelmann's botanical papers.

PAIPALOPSIS IRMISCHIÆ Kühn, the representative of a new genus of smuts inhabiting the flowers of *Primula officinalis* and *P. elatior*, which was described by the discoverer in *Irmischia* for May, 1882, is thought by Winter (*Hedwigia*, Jan., 1884) to be the conidial condition of a *Urocystis*. He hopes to decide the question by means of cultures during the coming season.

IN THE *Edinburgh Medical Journal* for March there is a very interesting sketch of the late Prof. J. H. Balfour. He was born in Edinburgh in 1808, and for thirty-four years filled the chair of botany in the University of Edinburg. It is said that nearly 8,000 students have been under his tuition, many of whom are scattered over the globe occupying important scientific positions.

THE STATISTICS relating to the present knowledge of the occurrence of wheat rust in England and its dependence upon soil, temperature, moisture, methods of cultivation, etc., are very fully given in the second part of the *Journal of the Royal Agricultural Society* for 1883. The sixty pages devoted to the subject are full of interesting and valuable information, and we regret our space will not allow of a more extended notice.

A CURIOUS INSTANCE of the inconvenience arising from the diversity of language spoken by botanists in different parts of the world, occurs in the February number of *Hedwigia*. Prof. Saccardo, wishing to notice the criticisms made by Mr. Cooke upon his mycologic work, sent a reply written in French, to that journal. Thus an Italian, in order to publicly communicate with an Englishman, clothes his thoughts in the French language, and makes them known through the medium of a German periodical. And yet there are some among us who think it unnecessary to be familiar with any but the mother tongue!

IT IS DOUBTLESS not generally appreciated that the association of barberry bushes with wheat rust is no new thing, even in our own country. Massachusetts in 1755 passed an "act to prevent damage to English grain arising from

barberry bushes" (Province Laws of Mass., 1736–61, p. 153), which provided for all manner of contingencies such as the removal of the bushes from public highways, undivided property, division lines, and lands of careless tenants or proprietors. Any one, after giving due notice, might extirpate any remaining bushes whatever, and charge the expense of the same to the owner of the land, and upon his refusal or neglect to pay, might collect twice the sum by process of law.

THE RESULTS of the study of peach yellows during 1881 and 1882, by Prof. D. P. Penhallow, are given in series III. of the Houghton Farm reports. The attempt has been, not so much to ascertain the cause of the disease, as to establish a satisfactory diagnosis, and to provide a remedy. In these respects, the research has been most painstaking and successful. The report is accompanied by three colored plates, showing healthy and diseased leaves and tissues of the stem, while a fourth gives the appearance of affected trees. The results have been verified by the observations of 1883, lately published in the same series of reports.

MR. L. H. BAILEY, JR., of the Botanic Gardens, Cambridge, has just published a catalogue of North American Carices. This list includes 293 species and 84 varieties, and the latest changes in synonymy are given, as well as the general distribution of each species. Among the many exasperating groups of plants *Carex* holds high rank, and botanists will be very thankful for any help in unravelling what seems often an inextricable tangle. This catalogue is a step in the right direction, and Mr. Bailey has the opportunity of laying botanists under great obligation by his studies in *Carex*. Copies of the catalogue can be obtained from the author at five cents a copy, or fifty cents a dozen.

NINE SPECIES of barberry are now known to harbor the æcidium of *Puccinia graminis*. Two of these are sometimes referred to the genus *Mahonia*, one of which, *Berberis* (*Mahonia*) *aquifolium*, has through the observations of Mr. C. B. Plowright been but recently connected with wheat rust. Of this list *B. Canadensis* is a native of our Southern States, *B. aquifolium* is native of Oregon, and the common barberry is widely although sparsely grown throughout our territory. We have besides two native western species and an ornamental species from Japan. The wheat rust does not seem to be lacking for an opportunity to occasionally reinvigorate itself by the production of cluster-cups, yet it is the opinion of many that some still more common host will yet be detected.

IN SACH'S *Vorlesungen über Pflanzenphysiologie* he discards the four plant elements as given in his text-book, and refers all plant organs to two categories, root and shoot. In a review in the last *Am. Jour. Sci.* Prof. Goodale thus defines the two: The former (the root) comprises that part of the plant which on or in a substratum serves as a hold-fast, and in the latter case acts as an organ for conducting into the plant nutritive matters held in the substratum. The shoot is that part which unfolding outside of the substratum produces plant-substance and serves for propagation, bearing organs of reproduction which are never seen on roots. According to this the rhizoid of a thallophyte and the

root of a vascular plant are the same. It is to be hoped that these lectures will speedily find a translator.

THE COMMITTEE appointed by the American Botanical Club of the A. A. A. S., to make suitable preparations for the meeting at Philadelphia, are arranging a programme as rapidly as the movements of the local committee of the association will permit. They are taking every means to make the occasion one of pleasure and profit. This committee consists of Messrs. J. C. Arthur, of Geneva, N. Y., and J. H. Redfield, of Philadelphia, as originally appointed, who have selected as the third member Mr. Thomas Meehan, of Philadelphia. At a late meeting of the Philadelphia Academy of Sciences, five botanists were appointed to co-operate with this committee, and especially to assist in carrying out the details of the programme during the meeting. They are Isaac C. Martindale, Prof. Joseph T. Rothrock, Dr. J. Bernard Brinton, Wm. C. Stevenson, Jr., and Jos. O. Schimmel.

AT A RECENT meeting of the Botanical Section of the Philadelphia Academy Mr. Meehan exhibited some nuts of *Carya glabra* which had two or three nuts in a single exocarp, as in the common chestnut. Dr. Asa Gray remarked that such specimens were of much morphological significance, and that the conclusion to which they inevitably pointed was as follows: The husk, or so-called exocarp, of *Carya*, is an *involucre*, usually containing a single female flower, and connate with its ovary; its true morphology is revealed when, as in this case, it contains two or three flowers. The stone or shell of the nut is the whole pericarp in *Carya* as much as in *Corylus*. In the former genus it becomes free from the four valved involucre at maturity; in *Juglans* the congenital union is more permanent, forming a drupaceous accessory fruit, of which the fleshy part is involucre, the bony part is pericarp. This view directly homologizes the *Juglandaceæ* with the *Cupuliferæ*.

A NEW PERIODICAL of considerable interest to botanists and lovers of plants in general has just made its appearance. It is edited and published by J. M. and C. G. Lloyd, of Cincinnati, Ohio, under the name "*Drugs and Medicines of North America*," and is to be, according to the title page, "a quarterly devoted to the historical and scientific discussion of botany, pharmacy, chemistry and therapeutics of the medicinal plants of North America, their constituents, products and sophistications." Let no one be frightened by this formidable cognomen, for its dryness and shoppy flavor scarcely extend beyond the cover. The number before us, consisting of thirty-two royal octavo pages, treats of *Clematis Virginiana*, *Thalictrum dioicum*, *T. anemonoides*, *Anemone nemorosa* and *A. patens*, var. *Nuttalliana*, and is illustrated with thirteen cuts, of which four are full page, one of the latter containing microscopic details of structure. The treatment of each plant is accurate, varied and interesting, and embraces little that every general student of plants would not be glad to know. The heavy paper, fine engravings, and excellent typography leave nothing in this line to be desired. All this in connection with the low annual subscription ($1.00) should heartily commend it to botanists as well as to physicians and pharmacists.